

SPECIFICATION

Attorney Docket No. 0590MH-40213-US

TO ALL WHOM IT MAY CONCERN:

BE IT KNOWN that we, Carl Brock Brandenburg and Robert L. Kay, both U.S. citizens, have invented new and useful improvements in a

PHYSICAL CONFIGURATION OF A HAND-HELD ELECTRONIC COMMUNICATION DEVICE

of which the following is a specification:

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By:

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1 This application claims the benefit of U.S. Provisional Application No.
2 60/172,675, filed December 20, 1999, titled "Physical Configuration of a Handheld
3 Electronic Communication Device."

4 BACKGROUND OF THE INVENTION

5 1. Field of the Invention:

6 The present invention relates to the physical configuration of hand-held,
7 electronic devices. In particular, the present invention relates to the physical
8 configuration of hand-held, electronic devices capable of bi-directional, wireless data
9 communication.

10 2. Background Information:

11 Until now, hand-held, wireless devices have primarily been used for person-to-
12 person communication by voice, transmitting and receiving voice data in real-time.
13 These "mobile phone" devices have allowed users to go wherever they like and still be
14 in touch with their friends and colleagues just as though they were using a wired phone
15 at home or work. Communication by textual means, such as e-mail, has been
16 performed almost exclusively over land-based copper and fiber optic phone lines,
17 because the wireless communication networks have simply not had the capacity or
18 capability to provide cost effective, wireless transmission of textual data. But recent
19 advancements in wireless technology have made it possible to provide cost-effective
20 data transfer over existing wireless networks.

21 The most common means of textual communication has been e-mail, but a
22 relatively new form of messaging called "instant messaging" (IM) has caught on and has
23 grown very rapidly in popularity in the last several years. Unlike e-mail which sits in an
24 electronic mailbox until the user retrieves his or her e-mail messages, IM occurs nearly
25 instantaneously, producing a notification and a dialog box on a user's screen alerting

1 the user that they have an incoming message. In addition, users have the ability to
2 know if the recipient is on-line and available to receive an IM message.

3 Many hand-held, wireless devices are beginning to provide access to e-mail, but
4 their functionality is currently very limited. The user is usually limited to browsing, that is
5 receiving and reviewing the information, not authoring and sending data. Much like
6 retrieving voice messages from a voice mailbox, the user is only able to retrieve e-mail
7 messages from their e-mail inbox. The primary reason for this is that authoring
8 messages requires a convenient method of alphanumeric data entry. Users are
9 hesitant or reluctant to enter a message if the data entry process is slow and difficult.
10 This is a problem that conventional devices cannot properly address due to user
11 interface limitations, i.e., the capabilities, design, and layout of the physical devices.
12 While e-mail may require entry of a moderate length message in response to a received
13 message, such data entry usually happens at a time the user deems appropriate and
14 convenient, not at a time dictated by the sender of the message. This is very much like
15 the user being able to periodically check voice messages in a voice mailbox, and
16 respond at the user's convenience.

17 However, IM and other types of instantaneous textual and graphical
18 communication are more real-time and intrusive than e-mail; the same way that an
19 incoming phone call is more real-time and intrusive than checking voice messages. IM
20 is a much more frequently accessed and used system than an e-mail client; therefore,
21 IM requires a network and device that are much more convenient to use than an e-mail
22 client. Such a level of convenience has been possible with wired connections and
23 desktop computers. With traditional desktop computers, the computer is placed on or
24 near the work surface and the display and keyboard are easily accessible. The user
25 can immediately see incoming IM messages presented on the display, then respond to
26 the IM messages using the keyboard. The user does not have to remove a device from
27 the user's belt clip or pocket and open the device to see the IM message. Neither does
28 the user have to then locate a work surface for support and connect a peripheral
29 keyboard in order to compose a response.

1 There are a variety of devices available that are capable of providing wireless
2 access to textual information, such as mobile phones, personal digital assistants
3 (PDA's), hand-held computers, and two-way pagers, but the compromises in all of these
4 designs limit their suitability as IM devices. For some of these devices, the displays are
5 always visible and easy to see, but the device lacks an input device, has a small and
6 inappropriate input device, has a slow and error prone method of data entry, or requires
7 additional peripheral devices and a work surface for support. For other devices, a
8 suitable input device is present, but the device transforms between multiple states
9 which prevent the display from being seen in one of the states, limiting the convenience
10 of using the device on a frequent basis.

11 Conventional wireless communication devices can be categorized into several
12 distinct configurations: (1) mobile phones, commonly known as cellular phones; (2)
13 personal digital assistants, commonly referred to as PDA's; (3) hand-held computers,
14 commonly referred to as palmtop computers; and (4) two-way pagers.

15 The configuration of a mobile phone typically consists of: (1) a small display that
16 is always visible; (2) a keypad for numeric data entry; and (3) an internal communication
17 module that can transmit and receive analog and/or digitized voice data.

18 The mobile phone configuration has the following disadvantages: (1) the display
19 is typically very small and inappropriate for display of large amounts of textual data, i.e.,
20 they are typically proportioned for one or two rows of phone numbers and proper
21 names, not textual data in the structure of a written sentence; (2) the keypad is
22 commonly located adjacent to the display, increasing the overall size of the unit; (3) on
23 some units, the device has a clamshell design that obscures both the keypad and
24 display when closed; (4) the keypad is typically a twelve-digit keypad designed for
25 numeric data entry, although the keyboard usually supports alphanumeric character
26 entry for the purpose of entering proper names into an address book maintained in the
27 phone's memory, whereby the commonly used method of accessing alphanumeric
28 characters is to switch the device into a text entry mode, then press a key repeatedly to
29 access a particular one of a subset of characters available for each key, this method

being extremely slow, awkward, error prone, and not appropriate for a device intended to transfer textual data on a regular basis; and (5) the communication module is typically engineered to support voice communication, and in only the latest device versions, limited retrieval of alphanumeric data.

The configuration of a PDA typically consists of: (1) a large display that is always visible; (2) a touch screen and stylus for data entry; (3) no keyboard for data entry; and (4) no internal communication module.

The PDA configuration has the following disadvantages: (1) the device has no keyboard, so alphanumeric data entry is usually performed in one of two ways: (a) the user taps with a hand-held stylus on a "soft" keyboard that is drawn on the display, or (b) the user writes on screen with a hand-held stylus and the processor converts the user's writing into text data; (2) an optional detachable keyboard may be available, but the keyboard usually requires a flat surface for support during use as it is tethered to the device by a cable or attaches in such a way that it will easily become detached if tilted, thus making the keyboard extremely awkward for use in one hand while on the move; and (5) the device lacks a communication module, although modules may sometimes be added, but at the expense of consuming the port available for connecting the optional keyboard to.

The configuration of a palmtop computer typically consists of: (1) a large display screen; (2) a complete keyboard; (3) a clamshell design where the display closes over the keyboard, or a flat layout where the display is located adjacent to the display; and (4) no internal communication module.

The palmtop configuration has the following disadvantages: (1) although the clamshell design affords protection to the display and keyboard when the device is closed, the clamshell design often renders the display non-visible when the device is closed, and is not adequate for frequent presentation of information to a user on the move; and (2) the relatively large size makes the device prohibitive for use as an IM device, because when a large display and keyboard are present, the device becomes

1 inconvenient for the user to carry on a regular basis, resulting in the usability of the
2 display and keyboard being greatly reduced.

3 The configuration of a two-way pager typically consists of: (1) a small display
4 screen; (2) a small, complete keyboard; and (3) a flat layout where the keyboard is
5 located adjacent to the display, or clamshell design where the display folds over the
6 keyboard when closed.

7 The two-way pager configuration has the following disadvantages: (1) units with
8 a flat layout have displays that are always visible, but to keep the overall device size
9 down, the display and keyboard are reduced to minuscule dimensions which greatly
10 reduces their usability; and (2) units with a clamshell design, render the display non-
11 visible when the unit is closed, adding inconvenience when the user must look at the
12 display.

13 The distinction between each category of devices is blurring daily, but a trend is
14 very evident in all the previously mentioned devices. The devices are either: (1)
15 designed primarily for voice communication and have limited alphanumeric entry
16 capability, or a capability that is not suited to use in your hands while on the move; or
17 (2) designed primarily for occasional retrieval and display of textual information and
18 have a design that is very inconvenient for frequent input and viewing of data while on
19 the move.

20 Some of these concepts are embodied in the following U.S. patents: U.S. Design
21 Patent No. Des. 416,256 issued to Griffin et al. which discloses a hand-held messaging
22 device with keyboard; U.S. Patent No. 5,548,478 issued to Kumar et al. which discloses
23 a portable computing device having an adjustable hinge; U.S. Patent No. 5,638,257
24 issued to Kumar et al. which discloses a combination keyboard and cover for a hand-
25 held computer. U.S. Patent No. 5,712,760 issued to Coulon et al. which discloses a
26 compact foldable keyboard; and U.S. Patent No. 5,949,408 issued to Kang et al. which
27 discloses a dual orientation display hand-held computer. These devices either have

SUMMARY OF THE INVENTION

There is a need for a hand-held, electronic, bi-directional, wireless communication device that 1) contains a relatively large, constantly visible display capable of rich presentation of information, 2) that contains an alphanumeric keyboard that is usable by human hands and 3) that is small enough to carry and convenient enough to use under usage conditions typically encountered with a mobile phone device.

Therefore, it is an object of the present invention to provide a hand-held, electronic, bi-directional, wireless communication device having a physical configuration which includes a relatively large, constantly visible display and an alphanumeric keyboard that can be concealed until needed.

It is another object of the present invention to provide a hand-held, electronic, bi-directional, wireless communication device having a physical configuration which includes a body portion, a display portion that translates relative to the body portion, a relatively large, constantly visible display carried by the display portion, and an alphanumeric keyboard carried by the body portion, the alphanumeric keyboard being concealed by the display portion when not in use.

It is another object of the present invention to provide a hand-held, electronic, bi-directional, wireless electronic communication device having a physical configuration which includes a body portion, a display portion that pivots relative to the body portion, a relatively large, constantly visible display carried by the display portion, and an alphanumeric keyboard carried by the body portion, the alphanumeric keyboard being concealed by the display portion when not in use.

It is another object of the present invention to provide a hand-held, electronic, bi-directional, wireless communication device having a physical configuration which includes a body portion, a display portion coupled to the body portion, a relatively large, constantly visible display carried by the display portion, and an alphanumeric keyboard that translates into the interior of the body portion when not in use.

1 It is another object of the present invention to provide a hand-held, electronic, bi-
2 directional, wireless communication device having a physical configuration which
3 includes a body portion, a display portion coupled to the body portion, a relatively large,
4 constantly visible display carried by the display portion, and a two-piece alphanumeric
5 keyboard that translates into the interior of the body portion when not in use.

6 These objects are achieved by providing a hand-held, electronic, bi-directional,
7 wireless communication device having a physical configuration which includes a
8 relatively large, constantly visible display and an alphanumeric keyboard that can be
9 concealed until needed. The communication device of the present invention has a
10 physical configuration operable between an "open" state in which the alphanumeric
11 keyboard is visible, and a "closed" state in which the alphanumeric keyboard is
12 concealed. This allows the information presented by the communication device to be
13 viewable in either the open or closed state. A user can quickly and easily transform the
14 device from the closed state to the open state with either one or two hands, while
15 viewing the constantly visible display without interruption. The display is larger than
16 those used on mobile phones and can display text and graphics at a convenient size
17 and resolution. The alphanumeric keyboard is easier and faster to use and learn than
18 the keypads and touch screens on most mobile phones and personal digital assistants.
19 The keyboard may be a keyboard with a layout such as the common "QWERTY" layout,
20 but need not be limited to this particular layout. Other layouts may include the "FITALY"
21 layout, the "Dvorak" layout or any other alphanumeric layout that includes a
22 substantially full set of alphanumeric keys.

23 The present invention has many advantages over existing device configurations.
24 Because the display is constantly visible, the user can immediately see incoming
25 messages or communications and respond appropriately. The display is relatively large
26 to accommodate long textual messages, graphical communications, or a combination of
27 both. The user can quickly and easily transform the device from the closed state to the
28 open state without his view of the display being interrupted. The full alphanumeric
29 keyboard allows the user to quickly and easily transmit messages and other textual and
30 graphical communications in a complete and intuitive manner without having to attach

BRIEF DESCRIPTION OF THE DRAWINGS

✓ Figure 1A is a perspective view of a simplified representation of the hand-held, electronic communication device having a physical configuration according to the present invention.

Figure 1B is a perspective view of the device of Figure 1A depicting how a constantly visible display translates relative to a body portion to expose a keyboard or other data input device that is carried by a body portion.

Figure 1C is a perspective view of the device of Figure 1A with the constantly visible display in a position which fully reveals the keyboard or data input device.

Figure 2A is a perspective view of an alternate simplified representation of a hand-held, electronic communication device having a physical configuration according to the present invention.

Figure 2B is a perspective view of the device of Figure 2A depicting how a constantly visible display pivots relative to a body portion to reveal a keyboard or other data input device.

Figure 2C is a perspective view of the device of Figure 2A depicting how the constantly visible display further pivots relative to the body portion to reveal the keyboard or other data input device.

Figure 2D is a perspective view of the device of Figure 2A with the constantly visible display pivoted to fully reveal the keyboard or other input device.

Figure 3A is a perspective view of an alternate simplified representation of a hand-held, electronic communication device having a physical configuration according to the present invention.

Figure 3B is a perspective view of the device of Figure 3A depicting how a keyboard or other data input device extends outward from the interior of a body portion.

1 ✓ Figure 3C is a perspective view of the device of Figure 3A with the keyboard or
2 other data input device in a fully extended position.

3 Figure 4A is a front view of a hand-held, electronic, bi-directional wireless
4 communication device having a physical configuration of the type illustrated in Figures
5 1A-1C in a closed state.

6 Figure 4B is a rear view of the device of Figure 4A.

7 Figure 4C is a right side view of the device of Figure 4A.

8 Figure 4D is a bottom view of the device of Figure 4A.

9 Figure 4E is a front view of the device of Figure 4A in an open state in which a
10 constantly visible display is translated relative to a body portion to fully reveal a
11 keyboard or other input device.

12 Figure 4F is a rear view of the device of Figure 4A while in the open state of
13 Figure 4E.

14 Figure 5A is a front view of an alternate hand-held, electronic, bi-directional
15 wireless communication device having a physical configuration of the type illustrated in
16 Figures 1A-1C in a closed state.

17 Figure 5B is a rear view of the device of Figure 5A.

18 Figure 5C is a right side view of the device of Figure 5A.

19 Figure 5D is a front view of the device of Figure 5A in an open state in which a
20 constantly visible display is translated relative to a body portion to fully reveal a
21 keyboard or other input device.

22 Figure 6A is a front view of a hand-held, electronic, bi-directional wireless
23 communication device having a clamshell-type physical configuration in which a
24 keyboard or other input device hingedly pivots relative to a constantly visible display.

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DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring generally to Figures 1A-1C, 2A-2D, and 3A-3C in the drawings, simplified representations of a hand-held, electronic communication device having a physical configuration according to the present invention are illustrated. To be convenient for IM and other instantaneous textual and graphical communications, a device must be able to support effortless reading of incoming IM messages and rapid entry of responses. Such support minimizes the inconvenience of the intrusion of the IM message. The device should allow a minimum amount of effort to perform the tasks involved when using IM.

The device configuration of the present invention provides the following unique and distinct features:

1. A relatively large display screen capable of displaying textual and graphical information, allowing for a rich presentation of information;

2. A display screen that is always visible. If, for example, the device must transition from a closed state that is characterized by maximum portability to an open state that is characterized by maximum usability, the display is constantly visible in each state. Users are very intolerant of a device that must be manipulated and opened in order to view the display each and every time a message or notification occurs;

3. An alphanumeric data entry means that is suitable for use with human hands without the aid of an additional pointing device such as a stylus and that is designed for rapid entry of alphanumeric data; and

4. A relatively small size which makes the device convenient for portable use and allows the device to be operated, ideally, with one or two hands.

To ensure that the device of the present invention is appropriate for mobile use, the device is small and convenient to carry and use. The device is capable of being configured in at least two distinct states that maximize both its portability and usability.

1 One device state maintains a small footprint, whereby the device consumes a minimal
2 amount of volume and affords a greater level of portability and concealment, herein
3 called the "closed" state. In this closed state, the display is visible, but the keyboard is
4 concealed to minimize space and maximize portability. A second device state affords a
5 more efficient level of alphanumeric data entry, herein called the "open" state. In the
6 open state, the display is visible and the keyboard is accessible to maximize usability.
7 The device can transition from the open state to the closed state easily and with a
8 minimum of effort, preferably with one hand. Preferably, the display translates relative to
9 the main housing to reveal the keyboard. However, the display may either pivot or
10 rotate relative to the housing to reveal the keyboard, or the keyboard may telescope into
11 the interior of the housing. In the preferred embodiment, the device's display remains
12 visible in either state, allowing the user to observe incoming messages without having to
13 manipulate the device to transition it from one state to another, such as from closed to
14 open.

15 In order to overcome the limitations of current hand-held, electronic devices that
16 serve or can be adapted to the purpose of bi-directional, wireless communication of
17 textual and graphical information., the present invention provides a new and improved
18 configuration of a device that allows for the inclusion in the device of both a large,
19 always visible display screen and an alphanumeric data input device that allows rapid
20 and comfortable entry of alphanumeric data. The device of the present invention
21 preferably has a large, color display screen capable of displaying textual and graphical
22 information for rich presentation of information. Because the display screen is always
23 visible and hence exposed and susceptible to damage, a cover made of either a rigid or
24 flaccid material to afford protection may protect the display. The cover may be of a
25 material such as a clear plastic or rubber that allows the display to remain visible even
26 when covered. Further, the device of the present invention has an alphanumeric data
27 input device that allows rapid and comfortable entry of alphanumeric data. The present
28 invention provides a configuration such that the device can be held and operated with
29 one or two hands in a convenient and comfortable manner under usage conditions
30 typically encountered with a mobile phone device.

1 The device of the present invention comprises at least the following components:
2 (1) an alphanumeric data input device, such as a full QWERTY-type keyboard or
3 thumbboard; (2) a display device, such as an LCD, LED, or LEP display screen; (3) a
4 processor; (4) a power source, such as a battery or mechanical generator like a wind-up
5 spring mechanism; (5) a communication module, such as a CDPD, CDMA, GSM or
6 GPRS radio capable of wireless data transmission and reception; and (6) a physical
7 housing that contains these components and that consists of at least two discrete
8 portions that may translate, rotate and/or pivot relative to one another, one portion
9 containing a display device and one portion containing a keyboard.

10 The display, preferably color, is always visible as the device transitions from a
11 closed state characterized by maximum portability to an open state characterized by
12 maximum usability. The display may translate, rotate, or revolve relative to the main
13 housing of the device. The display will be large enough to accommodate simultaneous
14 textual messages, graphical displays, and graphical animations. The device and
15 corresponding wireless network include integral support of IM and other instantaneous
16 textual and graphical communication. The exterior layout of the device is heavily
17 influenced by the capability to effectively utilize these types of instantaneous
18 communication.

19 Although the device may be placed in an "off" state in which no power is supplied
20 to the device, it is preferred that the device remain either in an "on" state in which the
21 device has full functionality, or a "sleep" state in which the device may appear to the
22 user to be off, but is, in fact, performing certain background functions. In the fully
23 functional "on" state, the device is displaying digital content and the user is interacting
24 with the device. In the "sleep" state, the user is not interacting with the device and the
25 display screen on the device has cycled down and is not actively displaying digital
26 content. In the sleep state, the display screen may be blank or may be displaying a
27 preprogrammed graphic or image. If the device is in the sleep state and the user begins
28 to interact with the device, or if the user receives a "hot" communication, the device
29 immediately switches from the sleep state to the on state so that the user may fully
30 utilize all features and functionality of the device.

1 The device may include a variety of additional input/output components, such as
2 lights, LED's, buttons, joysticks, a touch pad, an analog responder, and others
3 components which allow the user to view information and manipulate the device to a
4 certain degree without transitioning the device to the open state.

5 A first device configuration is specifically depicted in Figures 1A-1C. A constantly
6 visible display 501 translates relative to a body portion 503 to reveal a full QWERTY-
7 type keyboard or other input device 505. This first device configuration includes the
8 following features: (1) the display remains visible when the device is in either the open
9 or closed state; (2) in the closed state, the display remains visible, but obscures the full
10 keyboard or other input device; (3) the display is generally parallel with the keyboard or
11 other input device and translates relative to the body portion such that the keyboard or
12 other input device is revealed when the device is transitioned from the closed state to
13 the open state; and (4) when transitioning from the closed state to the open state, the
14 display translates in a plane that is generally parallel to the plane of the keyboard or
15 other input device.

16 A second device configuration is specifically depicted in Figures 2A-2D. A
17 constantly visible display 507 pivots relative to a body portion 509 to reveal a full
18 QWERTY-type keyboard or other input device 511. This second device configuration
19 includes the following features: (1) the display remains visible when the device is in
20 either the open or closed state; (2) in the closed state, the display remains visible, but
21 obscures the input device; (3) the input device is movable such that it is revealed from
22 below the display when the device is transitioned from the closed state to the open
23 state; and (4) when transitioning from the closed state to the open state, the input
24 device moves in one or a combination of a sliding, hinging, or pivoting movements.

25 A third device configuration is specifically depicted in Figures 3A-3C. An input
26 device 513 translates into a body portion 515 which carries an always visible display
27 517. This third device configuration includes the following features: (1) the display
28 remains visible when the device is in either the open or closed state; (2) in the closed
29 state, the keyboard display remains visible, but obscures the input device; (3) the input

1 device is movable such that it is revealed from below the display when the device is
2 transitioned from the closed state to the open state; and (4) when transitioning from the
3 closed state to the open state, the input device moves in one or a combination of a
4 sliding, hinging, or pivoting movements.

5 Regardless of the configuration chosen, the device is a hand-held device that
6 can be held by one or two hands and conveniently carried or worn by the user on his or
7 her person. The device is operated in a convenient and comfortable manner under
8 usage conditions typically encountered with a mobile phone device.

9 The preferred configuration of a device 601 according to the present invention is
10 illustrated in Figures 4A-4F. The physical configuration of device 601 corresponds to
11 the configuration illustrated in Figures 1A-1C. In Figures 4A-4D, device 601 is shown in
12 the closed state in which an always visible display portion 603 conceals a novel
13 QWERTY-type thumbboard 605 that is carried by a body portion 607. In Figures 4E
14 and 4F, device 601 is shown in an open state in which display portion 603 has been
15 translated relative to body portion 607 to reveal thumbboard 605. As is best seen in
16 Figure 4F, display portion 603 may include a plurality of rigid support rails 611 that
17 telescope into body portion 607 to provide additional support of display portion 603
18 while device 601 is in the open state. It should be understood that other support
19 means, such as interlocking grooves on display portion 603 and body portion 607 may
20 also be used to provide additional support for display portion 603. Display portion 603
21 is dimensioned to house a plurality of components (not shown). Such components may
22 or may not be directly related to the display of images, such as a GPS antenna and
23 integrated circuit boards. Likewise, body portion 607 is dimensioned to house a plurality
24 of electronic components and systems and necessary integrated circuit boards, such as
25 the microprocessor (not shown) and cache memory (not shown).

26 Display portion 603 includes a display screen 615. Display screen 615 is
27 preferably a high-resolution, 16-bit color, reflective LCD screen being 320X240 pixels
28 having a diagonal display area of about 3.8 inches. It should be understood that other
29 comparable display screens may be used. Although always visible, display screen 615

1 will cycle down to a "power save" mode during periods of non-use to conserve power. A
2 cover or shade (not shown) may be utilized to protect display screen 615 from damage,
3 to enhance visibility, to prevent glare, or to alleviate or minimize other common
4 problems associated with such display screens. In the preferred embodiment, display
5 screen 615 is covered by a protective bezel (not shown).

6 Device 601 is powered by a portable power supply (not shown), such as
7 batteries. In this regard, a power supply cover 613 is provided to cover and protect the
8 portable power supply. In the preferred embodiment, the portable power supply is
9 rechargeable by placing device 601 in a docking station or charging station (not shown).
10 Although device 601 operates on DC current, device 601 may be plugged into and
11 powered by a conventional 110-Volt wall outlet (not shown) with the use of a
12 conventionally functioning AC to DC power transformer (not shown).

13 A plurality of push pads 617 are located at selected locations on display portion
14 603. Push pads 617 are preferably located such that the user may translate display
15 portion 603 relative to body portion 607 by pushing on push pads 617 with his thumb or
16 thumbs. In the preferred embodiment, display portion 603 is preferably made of rigid,
17 molded plastic or similar material. Body portion 607 is preferably made of a similar
18 material. As has become popular in recent years, display portion 603 and/or body
19 portion 607 may be partially transparent or translucent, having a colored tint. A plurality
20 of protective bumpers 619, preferably made of rubber or rubberized plastic, are coupled
21 to display portion 603 and body portion 607 at selected locations. A plurality of raised
22 grips 621 may be integrated into protective bumpers 619 to facilitate handling of and
23 interaction with device 601. Device 601 may be of modular construction so that a
24 plurality of the external components may be quickly and easily interchanged. Such
25 interchangeability allows the user to choose from a wide variety of exterior styles and
26 designs, thereby customizing device 601 to the user's particular tastes. In this manner,
27 the appearance of device 601 can be modified to suit the user's ever changing moods
28 and attitudes.

Device 601 includes a plurality of input/output devices, such as LED's 623, at least one speaker 625, a plurality of joysticks 627, conductive power terminals 629 for attachment to the docking station, an infrared (IR) port 631 for the transfer of data, a DC adapter port 633 for attachment of the power transformer, a headphone jack 635 for use with headphone speakers, an on-off switch 637 for toggling device between an "on" state, an "off" state, and/or a "standby" state, as further explained herein, and an analog responder 639. It will be appreciated that LED's 623, joysticks 627, and on-off switch 637 may be multi-functional. For instance, LED's 623 are preferably full-spectrum color LED's that can be selectively programmed by the user to display selected colors at selected intensities and/or selected flash frequencies in response to certain conditions. LED's 623 are particularly useful when display screen 615 has cycled down into the power save mode. This allows the user to interact with device 601 without transitioning device into the open state. By using only LED's 623, speaker 625, joysticks 627, IR port 631, and analog responder 639, a user can perform a considerable amount of input/output without transitioning device 601 into the open state.

Analog responder 639 is a one-dimensional, electronic touch pad disposed within device 601. Analog responder 639 is activated by the user touching selected areas of device 601. Preferably, analog responder 639 is disposed within and centrally located along a lower edge of body portion 607 closest to the user. Such location allows analog responder 639 to be usable when device 601 is either in the closed state or the open state, i.e., when display portion 603 is translated relative to body portion 607. It is preferred that analog responder 639 be adjacent or in close proximity to display screen 615, because analog responder 639 functions primarily to manipulate a cursor or graphical images being displayed on display screen 615. The one-dimensional functional boundaries of analog responder 639 are preferably indicated by raised end ridges 641 or similar visual indicia. For example, one boundary may be indicated by a "-" sign and the opposing end boundary may be indicated by a "+" sign. Such indicia are particularly useful because a primary function of analog responder 639 is to allow the user to selectively input a response to a query from an analog range of possible responses. Using the current example, the end boundary indicated by the "-" might

1 represent a negative response by the user to a query, such as "I do not like pizza;"
2 whereas the end boundary indicated by the "+" might represent a positive response by
3 the user to the same query, such as "I love pizza." In a similar fashion, analog
4 responder 639 is visually segmented, preferably by raised intermediate ridges 643, or
5 similar visual indicia placed incrementally along the length of analog responder 639
6 between end ridges 641. In the preferred embodiment, intermediate ridges 643 are
7 more pronounced at the center 645 of analog responder 639 and decrease in size or
8 shape, if applicable, toward end ridges 641. This allows the user to quickly determine
9 which portion of analog responder 639 the user is touching, tapping, or depressing.

10 Referring now to Figures 5A-5D in the drawings, an alternate embodiment of the
11 device of the present invention is illustrated. As with device 601, a device 701 has an
12 always visible display portion 703 and a body portion 707. The physical configuration of
13 device 701 corresponds to the configuration illustrated in Figures 1A-1C. Display
14 portion 703 carries a display screen 715, similar in form and function to display screen
15 615. Display portion 703 translates relative to body portion 707 to reveal a QWERTY-
16 type thumbboard 705 which is similar in form and function as thumbboard 605. As is
17 shown, device 701 includes similar input/output ports and devices as device 601, such
18 as LED's 723, at least one speaker 725, a plurality of joysticks 727, and an analog
19 responder 739. In addition, device 701 includes a conventional two-dimensional touch
20 pad 729 on the backside of device 701. Touch pad 729 is located such that it can be
21 utilized by the user while device 701 is in either the closed state or the open state.
22 Touch pad 729 may be programmed to map to display screen 715 in either an absolute
23 mode or a relative mode.

24 Referring now to Figures 6A-6C in the drawings, another alternate embodiment
25 of the device of the present invention is illustrated. In this embodiment, a device 801
26 has a clam-shell design. As with previously discussed embodiments, device 801 has an
27 always visible display portion 803 and a body portion 807 which carries a novel
28 QWERTY-type thumbboard 805. In this embodiment, a screen display 815 on display
29 portion 803 and thumbboard 805 on body portion 807 both face outward and are on
30 opposite sides of body portion 807 when device 801 is in the closed state. As device

1 801 transitions to the open state, display portion 803 hingedly pivots relative to body
2 portion 807 as indicated by arrow 809 in Figure 6B. In the open state, display screen
3 815 is adjacent to and visible above thumbboard 805. As is shown, device 801 includes
4 similar input/output ports and devices as device 601, such as LED's 823, at least one
5 speaker 825, a plurality of joysticks 827, and an analog responder 839.

6 Referring now to Figures 7A-7D in the drawings, another alternate embodiment
7 of the device of the present invention is illustrated. In this embodiment, a device 901
8 has a telescoping design. The physical configuration of device 901 corresponds to the
9 configuration illustrated in Figures 3A-3C. As with previously discussed embodiments,
10 device 901 has an always visible display screen 915. Display screen 915 is carried by a
11 body portion 907 into which a novel, two-piece QWERTY-type thumbboard 905a and
12 905b telescopes into from opposing sides of body portion 907. As is shown, device 901
13 includes similar input/output ports and devices as device 601, such as LED's 923, at
14 least one speaker 925, a plurality of joysticks 927, and an analog responder 939.
15 Joysticks 923 are carried on each piece of thumbboard 905a and 905b.

16 The device of the present invention has a configuration that has a relatively small
17 overall size, but is optimized for textual and other non-voice types of communication.
18 With advancements in radio technology, it is possible to include voice communication
19 capability without significantly increasing the overall size of the device. In accordance
20 with the preferred implementation of the present invention, a plurality of alternative
21 communication modes can be supported by the device and the associated wireless
22 network. Some communication modes can be considered to be "cold" forms of
23 communication, while other modes of communication may be considered to be "hot"
24 modes of communication. A cold mode of communication has a high degree of delay or
25 latency associated therewith. Conversely, a hot mode of communication is one which
26 has a low degree of delay or latency associated therewith. Generally, hot modes of
27 communication may be conducted in real time, or instantaneously. Preferably, the
28 alternative communication modes include an e-mail mode, an IM mode, a chat mode, a
29 voice mode, and a video phone mode. The following is a description of the operation of

1 the present invention to enable these various modes of communication as well as the
2 escalation or de-escalation of modes of communication.

3 The e-mail mode of communication is one in which text messages are keyed in
4 by one user and communicated in a text form over the wireless network to a designated
5 recipient. The e-mail mode of communication on the network utilizes conventional e-
6 mail formats and protocols. E-mail messages may be accumulated and saved in an
7 electronic in-box, whereby the e-mail messages may be read at the leisure and
8 convenience of the recipient.

9 The instant messaging mode of communication is one in which text messages
10 are keyed in by one user and delivered immediately to the recipient user if the recipient
11 user's device is in an IM receipt mode. IM messages received while in the IM receipt
12 mode subordinate other content on the recipient's device. Thus, IM is considered
13 "hotter" than e-mail. It is desirable that the IM mode of communication on the wireless
14 network utilizes conventional IM formats and protocols.

15 The chat mode of communication is one in which a plurality of communicants
16 have initiated a chat session in which text, graphical, or voice synthesized messages
17 are exchanged substantially concurrently in a dialog fashion. Because the users in a
18 chat session have affirmatively established a desire to communicate with each other,
19 chat is "hotter" than e-mail and IM. It is desired that the chat mode of communication on
20 the wireless network utilizes conventional chat formats and protocols.

21 The voice mode of communication is similar to a telephone conversation. The
22 voice mode of communication is possible when a mobile phone is embedded in the
23 device. Because the voice mode of communication is performed concurrently between
24 users in real time, it is "hotter" than e-mail, IM, or chat. It is desired that the voice mode
25 of communication on the wireless network utilizes conventional cellular or digital phone
26 formats and protocols.

27 The video-voice mode of communication is similar to a video phone
28 conversation. The video-voice mode of communication is possible when a mobile video

1 phone is embedded in the device. Because the video-voice mode of communication is
2 performed concurrently between users in real time, and involves current video, it is
3 "hotter" than e-mail, IM, chat, or voice. It is desired that the video-voice mode of
4 communication on the wireless network utilizes conventional cellular or digital video
5 phone formats and protocols.

6 In accordance with the preferred embodiment of the present invention, it is
7 possible for communicants to move between modes of communication from a relatively
8 "cold" mode of communication, such as IM, to a relatively "hot" mode of communication,
9 such as a voice. If during an IM session, the communicants decide to "switch up" to the
10 voice communication mode, they can simply input an appropriate command to their
11 respective devices, and the wireless network will establish the voice connection
12 between the users.

13 Conversely, it is possible for communicants to de-escalate modes of
14 communication from a relatively "hot" to a relatively "cold" mode of communication. This
15 could be done in an effort to reduce airtime or to conserve network energy. For
16 example, if two users are communicating to each other in the voice mode and decide to
17 "switch down" to a chat mode which may burn less network energy, the users simply
18 input an appropriate command to their respective devices, and the wireless network will
19 disconnect the voice connection between the users and establish a chat session
20 between the users.

21 Although the invention has been described with reference to a particular
22 embodiment, this description is not meant to be construed in a limiting sense. Various
23 modifications of the disclosed embodiments as well as alternative embodiments of the
24 invention will become apparent to persons skilled in the art upon reference to the
25 description of the invention. It is therefore contemplated that the appended claims will
26 cover any such modifications or embodiments that fall within the scope of the invention.